optical pickup portion from the semiconductor laser to the objective lens are accommodated in the actuator's movable portion which can be moved in the tracking direction and the focusing direction, it is possible to realize the small-sized and extremely light-weighted optical pickup portion, and it is also possible to realize the high-speed seeking operation.

Heretofore, the explanation is focused mainly on the optical pickup. However, the technical thoughts of the present invention can be applied also for the magneto-optic pickup. So, the present invention is not limited to the optical pickup only. Instead, it can be applied to both.

What is claimed is:

1. An optical pickup apparatus comprising:

a light source;

an objective lens for focusing light ray flux emitted from said light source on an optical recording medium;

a quarter-wave plate located between said light source and said optical recording medium;

a flux separating element configured to separate light rays reflected on said optical recording medium from an optical axis of incident light rays, said flux separating element being formed of a birefringent material and disposed in a divergent optical path between said light source and said quarter-wave plate; and

a light-receiving element positioned adjacent said light source and at a front side thereof for detecting a signal from said reflection light rays.

2. An optical pickup apparatus as defined in claim 1, wherein said light source is a semiconductor laser.

3. An optical pickup apparatus as defined in claim 1, wherein an incident plain surface of said flux separating element is not perpendicular to the optical axis.

4. An optical pickup apparatus as defined in claim 1, wherein said light source and said light-receiving element are unitarily constructed by combining both of them into one.

5. An optical pickup apparatus as defined in claim 1, wherein a plain plate made of birefringent material is employed as said flux separating element.

6. An optical pickup apparatus as defined in claim 1, wherein said flux separating element is employed as a window member of said semiconductor laser.

7. An optical pickup apparatus as defined in claim 1, wherein two pieces of prism consisting of same sort of uniaxial crystal respectively having optical axes intersecting perpendicularly to each other are employed as said flux separating element, such that when a refractive index for ordinary light rays of the prism η_o is larger than a refractive index for extraordinary light rays η_e, an incident angle of the ordinary light rays transmitted through the first prism to the second prism is δ, and a counterclockwise angle from the optical axis of the ordinary light rays is in a plus (+) direction when the value of δ becomes larger than zero, and such that when η_o is larger than η_e, an incident angle of the extraordinary light rays transmitted through the first prism to the second prism is δ, and a counterclockwise angle from the optical axis of the extraordinary light rays is in a plus (+) direction when the value of δ becomes smaller than zero ($\delta<0$).

8. An optical pickup apparatus as defined in claim 1, wherein said light source, said light-receiving element, said flux separating element, said quarter-wave plate and said objective lens are mounted unitarily to form a unitarily optical pickup portion.

9. An optical pickup apparatus as defined in claim 8, wherein said unitary optical pickup portion is accommodated in an actuator movable portion which can be moved both in a tracking direction and in a focusing direction.

10. An optical pickup apparatus as defined in claim 1, wherein said light source, said light-receiving element, said flux separating element, said quarter-wave plate and said objective lens are accommodated in an actuator movable portion which can be moved both in a tracking direction and in a focusing direction.

11. An optical pickup apparatus, comprising:

a semiconductor laser and at least one light-receiving element formed in a single stem and positioned such that said semiconductor laser emits light ray flux along a first optical path through an objective lens onto an optical recording medium in a form of a small spot to facilitate operation of recording, reproducing and/or erasing of optical information, and such that said at least one light-receiving element receives light from a second optical path that is at least partially different from said first optical path; and

a uniaxial crystal plate having a discontinuous surface and being disposed in said first optical path between said semiconductor laser and the objective lens;

wherein said light ray flux emitted from said semiconductor laser is transmitted along said first optical path through said uniaxial crystal plate to said objective lens for focusing on the optical recording medium; and

wherein light ray flux reflected from the optical recording medium is transmitted through said uniaxial crystal plate and along said second optical path to said at least one light-receiving element.

12. An optical pickup apparatus as defined in claim 11,

wherein a uniaxial crystal plate is hermetically sealed unitarily in a package containing said semiconductor laser and said at least one light-receiving element therein.

13. An optical pickup apparatus as defined in claim 11, wherein said at least one light-receiving element formed on said stem consists of two pieces of two-divisional light-receiving elements respectively having dividing directions different from each other, and a height of one of said light-receiving elements is the same as a height of said semiconductor laser, while a height of another one of said light-receiving elements is different from said height of said semiconductor laser.

14. An optical pickup apparatus as defined in claim 11, wherein a uniaxial crystal plate is hermetically sealed unitarily in a package containing said semiconductor laser and said light-receiving element therein.

15. An optical disc apparatus comprising:

a light source;

an objective lens for focusing light ray flux emitted from said light source on an optical recording medium;

a quarter-wave plate located between said light source and said optical recording medium;

a flux separating element configured to separate light rays reflected on said optical recording medium from an optical axis of incident light rays, said flux separating element being disposed in a divergent optical path between said light source and said quarter-wave plate; and

a light-receiving element positioned adjacent said light source and at a front side thereof for detecting a signal from said reflection light rays.

16. The optical disc apparatus as defined in claim 15, further comprising a collimator lens located between the flux separating element and the optical recording medium.

17. The optical disc apparatus as defined in claim 15,

wherein the light-emitting source is at a different height from that of the light-receiving element.

18. The optical disc apparatus as defined in claim 15,

wherein said flux separating element is a prism.

19. The optical disc apparatus as defined in claim 15,

wherein said optical disc apparatus is an optical pickup.

20. An optical disc system comprising said optical disc apparatus as defined in claim 15.

21. An optical pickup for use with a recording medium reflecting light flux incident thereon, comprising:

a source emitting light flux along an emitting direction;

a flux separating optical element having a first side that faces the source and through which light flux emitted from the source along the emitting direction enters,

and a second side through which the light flux exits the flux separating optical element;

a quarter-wave optical element through which the light flux from light source passes after having passed through the flux separating optical element;

a focusing optical element focusing onto a recording medium the light flux from the source after having passed through the flux separating and the quarter-wave optical elements;

said recording medium reflecting the light flux focused thereon to thereby produce a reflected light flux;

said reflected light flux passing through the focusing and the quarter-wave optical elements and entering the flux separating optical element through the second side thereof along an optical path that substantially coincides with a path of the light flux from the light source after exiting said

second side and in traveling to said recording medium through the quarter-wave and focusing optical elements;

a reflected light flux detector facing the first side of the flux separating optical element and receiving therefrom, along a detecting direction, reflected light flux that has entered through the second side;

said emitting and detecting directions being at an oblique angle to each other; and

said source and detector being spaced from each other in a direction transverse to both the emitting and the detecting directions.

22. An optical pickup as in claim 21 in which the flux separating optical element comprises a birefringent material.

23. An optical pickup as in claim 21 in which the flux separating optical element comprises a Wallaston prism.

24. An optical pickup as in claim 21 in which the flux separating optical element comprises a Rochon prism.

25. A method of directing incident light onto a reflecting recording medium and detecting reflected light therefrom, comprising:

emitting light flux from a source along an emitting direction;

causing the light flux emitted from the source to pass through a flux separating optical element, said light flux entering the flux separating optical element through a first side and exiting through a second side;

causing the light flux from the source that has exited the flux separating optical element through said second side thereof to pass through a quarter-wave optical element;

causing the light flux from the source that has passed through the quarter-wave optical element to pass through a focusing optical element and be focused onto a recording medium that

reflects the light flux focused thereon to thereby produce a reflected light flux;

said reflected light flux passing through the focusing and the quarter-wave optical elements and entering the flux separating optical element through the second side thereof along an optical path that substantially coincides with a path of the light flux from the source after exiting said second side and in traveling to said recording medium through the quarter-wave and focusing optical elements;

said reflected light flux exiting the flux separating optical element through the first side thereof and traveling along a detecting direction to a light flux detecting element;

said emitting and detecting directions being at an oblique angle to each other; and

said source and detector being spaced from each other in a

direction transverse to both the emitting and the detecting directions.

26. A method as in claim 25 in which the step of causing the light flux from the source to pass through a flux separating optical element comprises passing the light flux through a birefringent material.

27. A method as in claim 25 in which the step of causing the light flux from the source to pass through a flux separating optical element comprises passing the light flux through a Wallaston prism.

28. A method as in claim 25 in which the step of causing the light flux from the source to pass through a flux separating optical element comprises passing the light flux through a Rochon prism.

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